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ART UNIT	PAPER NUMBER
2622	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

		Application No.	Applicant(s)
Office Action Summary		10/642,625	ODA ET AL.
		Examiner	Art Unit
		Albert H. Cutler	2622

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *28 February 2007*.

2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-18* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-18* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1.   This office action is responsive to communication filed on February 28, 2007.

Response to Arguments

2.   Applicant's arguments filed February 28, 2007 have been fully considered but they are not persuasive.

3.   Applicant argues, the combination of Nagano and Canini teaches that the "*actual* area of pixel subregions 119a and 119b is indeed larger than that of the main region 119c". Applicant then further argues "the claims of the instant invention are directed to an *actual* area of the subregions as opposed to any *effective* area".

4.   The Examiner respectfully disagrees with Applicant's position. In the claim 1 of the instant invention, Applicant recites, "a subregion smaller in area than said main region". The claim language of claim 1 fails to distinguish the subregion as having a smaller "actual" area as opposed to any smaller "effective" area. Therefore, the areas of subregions 119a and 119b, are indeed smaller in area than the main region 119c.

5.   Applicant next argues that, "When the aperture is at a full state, then even the *effective* areas of the subregions 119a and 119b are larger than the area of 119c."

6.   The Examiner acknowledges that the effective areas of the subregions 119a and 119b are larger than the area of 119c when the aperture is at a full state. However, Nagano teaches that accurate exposure can be executed even if the stop of the image sensing lens is stopped down (see column 7, lines 27-43). Because accurate exposure control is independent of the state of the aperture, it is feasible that the aperture does not ever have to be at full state during a photographing operation. In which case the

areas of the subregions 119a and 119b are always smaller in area than that of the main

region 119c.

7.   Applicant argues, with regards to the combination of Nagano and Canini:

"In direct contrast to the instant invention, Canini in no way teaches comparison

of a sensitivity of a pixel for a predetermined quantity of light with a

predetermined sensitivity of a pixel for the predetermined quantity of incident

light."

8.   The Examiner respectfully disagrees with Applicant's position. Examiner asserts

that Canini does indeed teach of a comparison of a sensitivity of a pixel. Canini teaches

that an image can be underexposed (i.e. the sensor is not sensitive enough for the set

exposure period) or overexposed (i.e. the sensor is too sensitive for that exposure

period). Canini then uses the sensitivity data obtained to adjust the exposure time in

order to compensate for a sensitivity error that occurs with the input quantity of light.

See column 5, line 47 through column 6, line 3.

Nagano teaches of a predetermined sensitivity(i.e. when the aperture is at a full

or stopped down state), column 7, lines 20-46, figures 6a and 6b. In direct correlation,

an actual sensitivity of Nagano is at any aperture state between full aperture and

stopped down aperture. The exposure control is accurate regardless of the state of the

aperture, column 7, lines 25-43. Therefore, a predetermined quantity of light can be

photographed with a full or stopped aperture(i.e. predetermined sensitivity), or any

intermediate aperture state(i.e. an actual sensitivity).

The sensitivity comparison method taught by Canini is applicable to both the predetermined sensitivities with a predetermined quantity of light and actual sensitivities with a predetermined quantity of light taught by Nagano. The sensitivity comparison method of Canini allows a user to test for an underexposed or overexposed condition in a predetermined sensitivity taught by Nagano, and also test for an underexposed or overexposed condition in an actual sensitivity taught by Nagano, essentially comparing the two, and adjusting for any sensitivity errors that occur between predetermined and actual sensitivities.

9.   Applicant argues, with regards to the combination of Nagano and Canini:

"Furthermore, Canini in no way teaches or suggests pixel subregions, or even that a saturation detection routine (which is not comparable to the sensitivity error correction of the instant claims, as described supra) is even applicable to pixel subregions.

10.   The Examiner respectfully disagrees with Applicant's position. Nagano teaches that each subregion outputs a separate image(Nagano, figure 7, column 7, line 61 through column 8, line 3). The sensitivity comparison method taught by Canini is applied to an image output from an image sensor(Canini, column 5, lines 57-65). Therefore, since an image is read out from the pixel subregions of Nagano, and the sensitivity comparison method taught by Canini is applicable to an image, the method of Canini is applicable to the pixel subregions taught by Nagano.

11.   Therefore, the Examiner is maintaining the rejection.

Claim Rejections - 35 USC § 103

12.   The text of those sections of Title 35, U.S. Code not included in this action can

be found in a prior Office action.

13.   Claims 1-12, 15, and 16 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Nagano(US Patent 7,041,950) in view of Canini(US Patent

7,053,954).

The Examiner's responses to Applicant's arguments, as outlined above, are

hereby incorporated into the rejections of claims 1 and 15 by reference.

Consider claim 1, Nagano teaches:

A solid-state image pickup apparatus(Image Sensing Element) comprising:

a solid-state image sensor(10, figure 1, figure 2, column 6, lines 17-21)

comprising a plurality of photosensitive cells("The image sensor is made up of several

million pixels" column 6, lines 20-21) arranged in a two-dimensional array("two-

dimensional area sensor with 2X2 pixels" column 6, lines 19-20) for converting incident

light to electric signals(column 6, lines 52-58), each of said plurality of photosensitive

cells(figures 4, 6A, and 6B) including a main region(119c) and a subregion(119a or

119b) smaller in area than said main region(When the aperture is at anything less than

a full state, the effective areas of the subregions become smaller than that of the main

region. See figure 6A and 6B, column 7, lines 20-34);

a shutter("vertical scanning circuit" 116, column 8, lines 48-59) for adjusting an

end of an exposure time over which light incident to said solid-state image sensor is

subject to photoelectric transduction(The vertical scanning circuit changes a control to

high to start the exposure, and then turns the control pulse to low to end the exposure.

Column 8, lines 48-59);

and a system controller("image sensor control circuit" 21, figure 1) for controlling,

in response to an image pickup operation meant for said solid-state image sensor("an

image control circuit for driving and controlling the image sensor" column 5, lines 60-61)

However, Nagano does not explicitly teach of a sensitivity control circuit for

comparing actual sensitivity of each of said subregions for a predetermined quantity of

light with predetermined sensitivity of the subregion for the predetermined quantity of

incident light to determine a sensitivity error and compensating for the sensitivity error.

In a similar field of endeavor relevant to the pertinent problem(Process of

Regulating the Exposure Time of a Light Sensor, column 1, lines 7-11), Canini teaches

of a sensitivity control circuit(figure 6, column 7, line 46 through column 8, line 2) for

comparing actual sensitivity of each of a group of pixels for a predetermined quantity of

light with predetermined sensitivity of the pixel for the predetermined quantity of incident

light(A signal "Video" is proportional to the luminosity of the current pixel(i.e. an actual

sensitivity value). This value is compared to a prefixed global threshold value(i.e. a

predetermined sensitivity value) column 7, lines 53-59, figure 6) to determine a

sensitivity error and compensating for the sensitivity error(The sensitivity control
circuit(figure 6) determines if the pixel is saturated or underexposed(i.e. a sensitivity
error) based on the comparison of the actual and predetermined values, and
compensates by adjusting the exposure time. Column 7 line 61 through column 8, line
2).

Therefore, it would have been obvious to a person having ordinary skill in the art
at the time of the invention to use the sensitivity control circuit as taught by Canini for
regulating the exposure time of the sub-regions of the pixels in the digital camera taught
by Nagano in order to achieve an image that is rich in details(that is, it is well exposed)
and not saturated(Canini, column 2, lines 7-13).

Consider claim 2, and as applied to claim 1 above, Nagano further teaches:

each of said plurality of photosensitive cells(figures 4, 6A, and 6B) has a
photosensitive area divided into the main region(119c) and the subregion(119a or 119b)
different in area from each other(see figures 4, 6A, and 6B).

Consider claims 3 and 4, and as applied to claims 1 and 2 above, Nagano does
not explicitly teach:

a sensitivity error detector for comparing the actual sensitivity with the
predetermined sensitivity for determining the direction and an amount of the sensitivity
error; and an error adjuster for adjusting the direction and the amount of the sensitivity
error.

However, Canini teaches:

a sensitivity error detector(figure 6. The first comparator is the sensitivity error

detector. Column 7, lines 46-57) for comparing the actual sensitivity(Video) with the

predetermined sensitivity(Local threshold) for determining the direction("When the

voltage at the ends of the condenser exceeds the undesired global threshold level, the

SAT (or UNDER EXP) signal is generated" This signal indicates the direction of the

sensitivity error. Column 7, lines 61-66) and an amount(M values determine the amount

of sensitivity error because they correspond to the maximum and minimum exposure

times set. Column 5, lines 47-56, column 6, line 48 through column 7, line 18. For

example, a pixel would be more likely to saturate at a longer exposure time, and

saturation represents an amount of over-exposure.) of the sensitivity error;

and an error adjuster for adjusting the direction and the amount of the sensitivity

error("The exposure time is regulated to find an optimum exposure time" column 5, line

66 through column 6, line 3).

Consider claims 5-8, and as applied to claims 1-4 above, Nagano teaches of a

system controller and photosensitive cells segmented into main regions and

subregions(see claim 1 rationale). Nagano also teaches that a "monitoring output"

obtained from the main region is used to set the accumulation times of the light-

receiving regions 119a and 119b(column 8, lines 12-17).

However, Nagano does not explicitly teach:

said system controller detects the sensitivity error in the direction in which the

actual sensitivity becomes greater than the predetermined sensitivity and the sensitivity

error in the direction which the actual sensitivity becomes smaller than the

predetermined sensitivity as a positive error and a negative error, respectively, said

system controller using, on detecting the positive error, an exposure time of said main

region as a reference to delay a start of the exposure time of said subregion

independence upon the amount of the positive error, and using, on detecting the

negative error, an exposure time of said subregion as a reference to delay the exposure

time of said main region in dependence upon an amount of the negative error.

However, Canini teaches:

said system controller detects the sensitivity error in the direction in which the

actual sensitivity becomes greater than the predetermined sensitivity(Overexposure,

column 6, lines 11-28) and the sensitivity error in the direction which the actual

sensitivity becomes smaller than the predetermined sensitivity(Underexposure, column

6, lines 29-40) as a positive error(column 6, lines 11-28) and a negative error("negative

result" column 6, lines 29-40), respectively, said system controller using, on detecting

the positive error, an exposure time of said main region as a reference to delay a start

of the exposure time independence upon the amount of the positive error("therefore a

smaller exposure time should be set" column 6, lines 19-20), and using, on detecting

the negative error, an exposure time of a reference to delay the exposure time of said

main region in dependence upon an amount of the negative error("a greater exposure

time is set" column 6, lines 31-32)(Smaller exposure times correct positive errors and

longer exposure times correct negative errors. Column 6, lines 11-40).

Consider claims 9-12, and as applied to claim 5-8 above, Nagano teaches of a

system controller(see claim 1 rationale).

Conversely, Nagano does not explicitly teach of a sensitivity error adjuster.

However, Canini teaches:

said sensitivity error adjuster(see claim 3 rationale) comprises:

a timing signal generator for generating a timing signal(a "signal is generated

which indicates the presence of excessive saturation(or under-exposure) in the image

and, therefore, the necessity of setting a different exposure time." Column 7, lines 63-

66) for causing the exposure time in dependence upon the amount of the sensitivity

error to start("The process of the invention includes, advantageously, the setting of a

new exposure time Tn in a period of time 'n'" column 8, lines 19-20. The previous

exposure time is examined, and a new optimum exposure time Tn is set for the next

period. Column 8, lines 28-37);

and a driver for feeding a drive signal to said solid-state image sensor in

response to the timing signal("a new exposure time Tn is set on the sensor" column 8,

line 33. This new exposure time is in response to the timing signal generated as

illustrated above.).

Consider claim 15, Nagano teaches:

A method of adjusting outputs of photosensitive cells(column 3, lines 1-18)

comprising:

a first step of arranging a plurality of photosensitive cells in a two-dimensional

array("FIG. 2 shows a two-dimensional area sensor with 2X2 pixels(i.e. photosensitive

cells" column 6, lines 17-20, figure 2) for converting incident light to electric

signals(column 6, lines 52-58), each of the plurality of photosensitive cells(figure 4, 6A,

6B) including a main region(119c) and a subregion(119a or 119b) smaller in area than

the main region(When the aperture is at anything less than a full state, the effective

areas of the subregions become smaller than that of the main region. See figure 6A

and 6B, column 7, lines 20-34);

a third step of designating either one of the main region(119c) and the

subregion(119a or 119b) as a reference region while handling the other region as a

subject region to be adjusted(Nagano teaches of designating the main region, and using

the output of the main region(i.e. the reference) to determine the accumulation time of

the subregions(column 8, lines 13-18),

However, Nagano does not explicitly teach that the photocells are adjusted

according to a sensitivity error that must be cancelled. Nagano does not explicitly teach

a second step of comparing actual sensitivity of each of the subregions for a

predetermined quantity of light with predetermined sensitivity of the subregion for the

predetermined quantity of incident light to determine a direction and an amount of a

sensitivity error. Also, Nagano does not explicitly teach a fourth step of executing

processing for canceling the amount of the sensitivity error derived from the subject

region in accordance with the control.

In the same field of endeavor, Canini teaches that the photocells are adjusted

according to a sensitivity error that must be cancelled(column 5, line 57 through column

6, line 10).

Canini also teaches a second step(Column 7, lines 46-57, figure 6) of comparing

actual sensitivity(Video) of each of the pixels for a predetermined quantity of light with

predetermined sensitivity(Local threshold) of the pixels for the predetermined quantity of

incident light to determine a direction("When the voltage at the ends of the condenser

exceeds the undesired global threshold level, the SAT (or UNDER EXP) signal is

generated" This signal indicates the direction of the sensitivity error. Column 7, lines 61-

66) and an amount(M values determine the amount of sensitivity error because they

correspond to the maximum and minimum exposure times set. Column 5, lines 47-56,

column 6, line 48 through column 7, line 18. For example, a pixel would be more likely

to saturate at a longer exposure time, and saturation represents an amount of over-

exposure.) of a sensitivity error.

Canini further teaches a fourth step of executing processing for canceling the

amount of the sensitivity error derived from the subject region in accordance with the

control("The exposure time is regulated to find an optimum exposure time" column 5,

line 66 through column 6, line 3).

Therefore, it would have been obvious to a person having ordinary skill in the art

at the time of the invention to adjust the exposure time of the photosensitive cells based

on sensitivity as taught by Canini in the method for adjusting the output of

photosensitive cells taught by Nagano in order to achieve an image that is rich in

details(that is, it is well exposed) and not saturated(Canini, column 2, lines 7-13).

Consider claim 16, and as applied to claim 15 above, Nagano teaches using the

output of the main region to control the exposure time of the subregions(see claim 15

rationale).

However, Nagano does not explicitly teach:

said third step comprises: a substep of detecting the sensitivity error in the

direction in which the actual sensitivity becomes greater than the predetermined

sensitivity and the sensitivity error in the direction which the actual sensitivity becomes

smaller than the predetermined sensitivity as a positive error and a negative error,

respectively; and a substep of using, on detecting the positive error, an exposure time of

the main region as a reference to delay a start of the exposure time of the subregion in

dependence upon the amount of the positive error or using, on detecting the negative

error, the exposure time of the subregion as a reference to delay the exposure time of

the main region in dependence upon an amount of the negative error.

Conversely, Canini teaches:

a substep of detecting the sensitivity error in the direction in which the actual

sensitivity becomes greater than the predetermined sensitivity(Overexposure, column 6,

lines 11-28) and the sensitivity error in the direction which the actual sensitivity

becomes smaller than the predetermined sensitivity(Underexposure, column 6, lines 29-

40) as a positive error(column 6, lines 11-28) and a negative error("negative result"

column 6, lines 29-40), respectively;

and a substep of using, on detecting the positive error, an exposure time as a

reference to delay a start of the exposure time of the pixel in dependence upon the

amount of the positive error("therefore a smaller exposure time should be set" column 6,

lines 19-20) or using, on detecting the negative error, the exposure time as a reference

to delay the exposure time of the pixel in dependence upon an amount of the negative

error("a greater exposure time is set" column 6, lines 31-32)(Smaller exposure times

correct positive errors and longer exposure times correct negative errors. Column 6,

lines 11-40).

14.   Claims 13, 14, 17, and 18 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Nagano in view of Canini as applied to claims 4 and 15 above, and

further in view of Gaylord(US Patent 6,628,334).

Consider claims 13 and 17, and as applied to claims 4 and 15 above, the

combined invention of Nagano and Canini teaches of a system controller(see claim 1

rationale), and of dividing the pixel area into main and subregions(see claim 1

rationale).

However, the combined invention of Nagano and Canini does not explicitly teach

that the system controller amplifies the signal output from said subregion when the

negative error is detected.

In the same field of endeavor(Improving Image Signals, paragraph 0001), Gaylord teaches:

The system controller amplifies a signal output when the negative error is detected(Gaylord includes a gain control unit(figure 2, 250, figure 3, column 4, line 59 through column 5, line 11) that includes gain profiles containing predetermined signal values. When the actual values are not as strong as the predetermined values(i.e. a negative error), "the image signal processor amplifies the selected image signals of the charge image(i.e. actual values) to an amplification level specified by the gain profile(i.e. predetermined values)" column 5, lines 8-10).

Therefore it would have been obvious to a person having ordinary skill in the art at the time of the invention to use the gain control unit as taught by Gaylord in the subregions of the combined invention of Nagano and Canini in order to improve the quality of the charge image and overcome the problem of obtaining a signal that does not fall within the defined exposure range(Gaylord, column 1, lines 39-44).

Consider claims 14 and 18, and as applied to claims 13 and 17 above, the combined invention of Nagano and Canini teaches of a system controller(see claim 1 rationale), and of dividing the pixel area into main and subregions(see claim 1 rationale). The combined invention of Nagano and Canini also teaches of detecting an amount of sensitivity error, and correcting that error(see claim 4 rationale).

However, the combined invention of Nagano and Canini does not explicitly teach that the output of each subregion is amplified in order to correct an amount of negative error.

Gaylord teaches that the image signals are amplified in order to correct an amount of negative error(figure 8, column 6, line 66 through column 7, line 30. Gaylord teaches that an under-exposed area(i.e. a negative error) is amplified to a level corresponding to a gain profile, which indicates a level of desired brightness(i.e. the signal is amplified by the amount of negative error, which is the difference between the current signal and the signal specified by the gain profile)).

Conclusion

15.   All objections made to the specification by the Examiner have been withdrawn in view of Applicant's response.

16.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Albert H. Cutler whose telephone number is (571)-270-

1460. The examiner can normally be reached on Mon-Fri (7:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Ngoc-Yen Vu can be reached on (571)-272-7320. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

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AC

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